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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE 05 OCT 2005

In re the Application of

Shinichi SOEJIMA Attn: PCT Branch

Application No. New U.S. National Stage of PCT/JP2004/004928

Filed: October 5, 2005 Docket No.: 125497

For: APPARATUS FOR ABNORMAL DIAGNOSIS OF VARIABLE VALVE TIMING MECHANISM

SUBMISSION OF THE ANNEXES TO THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached hereto is a translation of the annexes to the International Preliminary Examination Report (Form PCT/IPEA/409). The attached translated material replaces claim 1.

Respectfully submitted,

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Enclosure of April 14, 2005
International Patent Application No.: PCT/JP2004/004928
Applicant: TOYOTA JIDOSHA KABUSHIKI KAISHA
Our ref: EP 44249

New claim 1

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1. An abnormality diagnosis apparatus (100) that diagnoses an abnormality of an adjustable valve mechanism (120), which varies a moving characteristic of a valve (16) in an internal combustion engine, said abnormality diagnosis device (100) comprising:

an input control signal module that inputs a control signal (step S10) for varying the moving characteristic of the valve (16);

a theoretical value computation module (140) that computes a physical behaviour of the adjustable valve mechanism (120) according to a physical model provided to simulate the physical behaviour of the adjustable valve mechanism (120) and thereby calculates a theoretical value of a parameter relating to the moving characteristic of the valve (16), which is varied by the adjustable valve mechanism (120), based on the input control signal;

an observed value detection module (130) that detects an observed value of the parameter relating to the moving characteristic of the valve (16), which is varied by the adjustable valve mechanism (120), in response to the input control signal; and

an abnormality detection module (150) that determines whether the adjustable valve mechanism is abnormal or normal, based on the theoretical value and the observed value.